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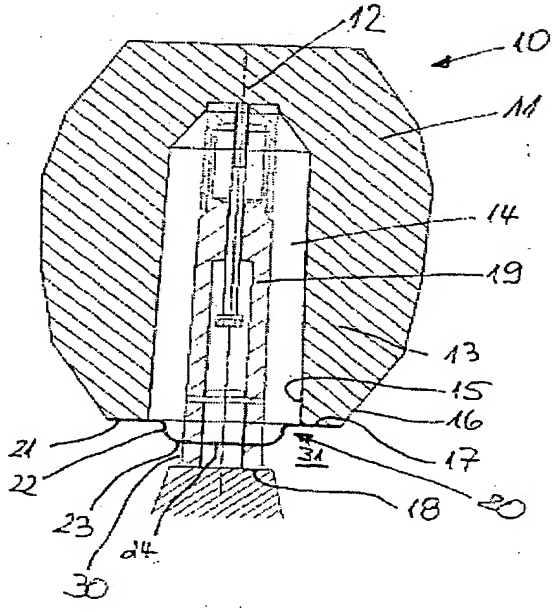
(54) Feeder with metallic feeder base

(57) A feeder insert to use in a casting mould used for pouring metal castings, consisting of a feeder body with a hollow cavity and made from an exothermic and/or insulating material, to whose lower face facing the mould region forming the casting a metallic annulus is attached, which itself forms a feeder aperture to create a desired breaker point intended for the feeder residue forming in the feeder cavity, characterised in that the annulus (20) is hat-shaped with a rim (21) attached to the lower face (17) of the feeder body (11) and a bottom face (23) on a sidewall (22) projecting towards the top face (18) of the mould and including the feeder aperture (24).



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Feeder insert with metallic feeder base

Description

A feeder insert to use in a casting mould used for pouring metal castings, consisting of a feeder body with a hollow cavity and made from an exothermic and/or insulating material, to whose lower face facing the mould region forming the casting a metallic annulus is attached, which itself forms a feeder aperture to create a desired breaker point intended for the feeder residue forming in the feeder space.

A feeder insert with the features noted above is described in DE 196 42 838 A1. In this, the annulus cemented or clamped to the lower face of the feeder body is shaped as a flat plate, having in its centre the feeder aperture with a smaller diameter than the feeder cavity, and which forms a desired breaker point for the feeder residue remaining in the

feeder cavity after pouring the casting. The plate consists of a suitable metal that keeps its shape and does not melt when contacted by the hot molten material as well as by the ignited exothermic feeder material. It is pointed out in DE 146 42 838 A1 that, when using the known feeder insert during the moulding with the moulding sand or, respectively, a suitable moulding material mixture, a layer of sand is inserted, or is intended to be inserted between the feeder insert's metal plate and the upper surface of the mould in order to produce insulation between the feeder insert and the hot metal surface of the casting formed as the molten material is poured into the mould cavity.

Compared with another breaker core between the feeder insert and upper mould surface that is also known, the metal plate has the advantage that, by using it, the feeder aperture is pushed relatively close to the upper mould surface. Furthermore, compared with breaker cores, the metal plate is better able to withstand the moulding pressure applied to it when forming the feeder insert, so that the risk of destroying the feeder insert during the forming operation is reduced. This type of damage must be avoided, therefore, because otherwise parts of the feeder insert may loosen before and during pouring and enter into the casting.

However, the known feeder insert still has a disadvantage in that the formation of the desired breaker point by the metal plate still does not guarantee breakage of the feeder residue near the surface of the casting with the required degree of operational safety so that it is still necessary to carry out rework on the finished casting which should be avoided. A further disadvantage lies in the risk that, due to the pressure exerted during the feeder moulding operation, the metal plate may detach from the feeder body and after removing the pattern [fall][1] in the casting device.

Thus, the task of the invention is to further improve a feeder insert with general features aimed at breakage of the feeder residue near to the surface of the finished casting as well as increasing the operational safety of the feeder insert.

The solution to this task stems, including advantageous versions and extensions of the invention, from the contents of the patent claims provided below, after this description.

In its basic concept, the invention provides that the annulus is hat-shaped with a rim attached to the lower face of the feeder body and a bottom face on a sidewall extending towards the top face of the mould and including the feeder aperture. The invention also has the advantage

[1] Word appears to be missing in original text - Translator

that the formation of the desired breaker point is improved by the hat-like shape of the metallic annulus according to the invention.

On the one hand, with the bottom face of the annulus in its overhanging position, the feeder aperture forming the desired breaker point is moved still closer to the upper mould surface; furthermore, structural transformations in the feeder residue produced in the pouring process are avoided in the internal space of the annulus since the molten metal entering the internal feeder space first fills the internal space of the hat-shaped annulus before the molten casting material comes into contact with the material of the feeder body. In doing so, essentially the same material structure is established in the feeder residue each side of the feeder aperture so that breaking off the feeder residue is guaranteed in the region of the narrowest cross section formed by the feeder aperture, which is the desired breaker point.

The hat-shaped form of the annulus provides an additional advantage with its stiffening effect, so that the annulus offers adequate stability with respect to the stress occurring when moulding the feeder insert. Thus the feeder insert with the metallic annulus can be moulded such that the bottom face of the annulus almost rests on the upper face of the mould, except for a very thin layer of sand that forms. Furthermore, it is possible to use a rigid moulding mandrel in place of the flexible mandrel that is often used.

The shape of the annulus provides a further advantage by preventing fall-off from the feeder insert. Regardless of how near to the upper face of the mould the bottom face of the annulus finally rests, however, a

sand layer forms over the component's sidewall between the upper face of the mould and the rim attached to the lower surface of the feeder insert. The layer of sand forms a support for the rim, or, in other words, the lower face of the feeder body in the region of the rim, so that there is no possibility that the annulus can fall into the mould cavity of the pattern.

One design example of the invention provides that, at the outer edge of the rim, an upright lip is formed enclosing the feeder body at its outer surface. Alternatively, provision can also be made on the rim of the annulus for an upright supporting lip extending into the inner cavity of the feeder body and enclosing the internal surface of the feeder body. Both designs provided appropriate stability for the lower face or lower region of the feeder body where the respective upright lip supports the edge region of the feeder body extending above the annulus. This prevents a break-up of the lower region of the feeder body in the area of its lower face when moulding pressure is applied and, thus, ensures that no feeder material can enter the casting.

The drawings illustrate examples of the designs of the invention, which are described below. They show:

Figure 1: A feeder insert resting on a moulding mandrel on the surface of a pattern,

Figure 2: The same item as in Figure 1 with additional support lips.

Firstly, as shown in Figure 1, the feeder insert designated as 10 has a feeder body 11 which incorporates a wall region 13 enclosing a feeder cavity 14 and a top cover 12. The feeder body has an outer surface 16 and an inner face 15 of the wall area 13 enclosing the feeder cavity 14, as well as having a lower face 17.

In the illustration in Figure 1, the feeder insert 10 is placed over a moulding mandrel 19 shown as a flexible mandrel which is located on the upper surface 18 of a mould.

A hat-shaped metallic annulus 20 is cemented to the underside of the feeder insert and, preferably, to its lower face 17. The hat-shaped annulus 20 is cemented by means of its circumferential rim 21 to, preferably, the lower face 17 of the feeder body 11 and extends via a sidewall 22 towards the upper face 18 of the mould. A feeder aperture 24 is provided in the bottom face 23 enclosing the annulus 20.

Figure 1 shows the situation of the feeder insert 10 as it rests on the moulding mandrel 19 before introducing the moulding sand, so that, as

the moulding process concludes, the gap 30 between the bottom face 23 of the annulus 20 and the upper mould face 18 is reduced. In each case, during moulding, the space 31 located between the rim 21 and the mould is filled with sand so that, in this region, a sand buffer is created around the sidewall 22 which retains the rim 21 of the annulus 20 on the lower face 17 of the feeder body 11.

The design example shown in Figure 2 differs from the design example shown in Figure 1 simply in that, to improve the support surface for the feeder body 11 on the rim 21 of the annulus 20, an upright lip 25 is provided enclosing the outer surface 16 of the feeder body 11 like a pot, while, on the inner side, a further upright lip 26 is arranged, extending into the feeder cavity 14 and supporting the internal face 15 of the feeder body 11. Both lips, 25, 26, may be provided singly or both in combination and they ensure that, when the moulding pressure is applied, the feeder body 11 does not break up in the region where it rests on the annulus 20.

The features of the subject of these documents revealed in the above description, the patent claims and the drawings may be individually present in essence as well as in any combination for the fulfilment of the invention in its various design versions.

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Feeder insert with metallic feeder base

Patent claims

1. A feeder insert to use in a casting mould used for pouring metal castings, consisting of a feeder body with a hollow cavity and made from an exothermic and/or insulating material, to whose lower face facing the mould region forming the casting a metallic annulus is attached, which itself forms a feeder aperture to create a desired breaker point intended for the feeder residue forming in the feeder cavity, characterised in that the annulus (20) is hat-shaped with a rim (21) attached to the lower face (17) of the feeder body (11) and a bottom face (23) on a sidewall (22) projecting towards the top face (18) of the mould and including the feeder aperture (24).

2. A feeder insert in accordance with Claim 1, characterised in that an upright lip (25) is formed on the outer circumference of the rim (21) enclosing the feeder body (11) at its outer surface (16) like a pot.

3. A feeder insert in accordance with Claim 1 or 2, characterised in that an upright lip (26) is formed on the rim (21) of the annulus (20) projecting into the feeder cavity (14) of the feeder body (11) and supporting the inner face (15) of the feeder body (11) including the feeder cavity (14).

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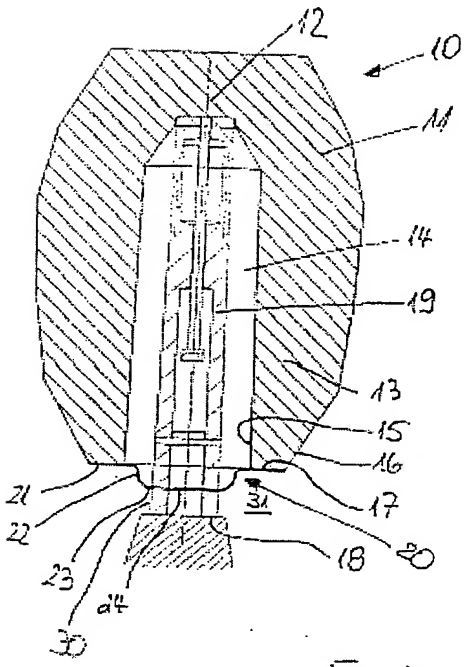

Fig. 1

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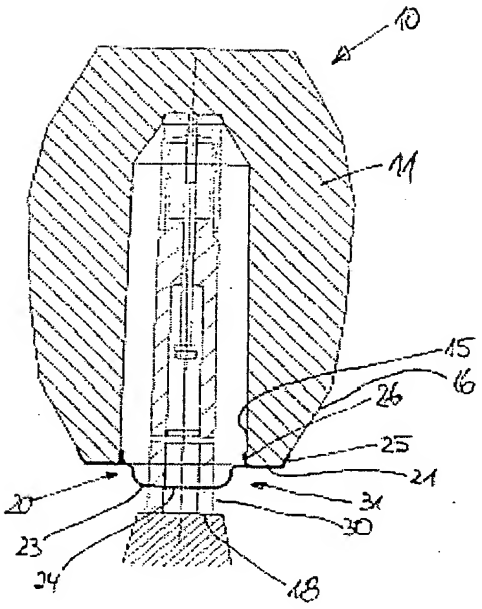

Fig. 2